Manager, Lake Andes NWR

February 11, 1971

Asst. Regl. Refuge Supvr., Twin Cities (RF)

Annual Water Program - 1971 - Lake Andes NWR

The annual water program for the Lake Andes Refuge is approved as submitted.

Please incorporate the data suggested in Mr. Stevenson's memorandum in next year's report.

Carlsen 2/11

J. C. Carlsen

Attachment
JCCarlsen:mc 2-11-71

Carpenter
Gritman

Carlsen
Mennie
Morgan

Dundas
Dykstra
Ellis
Hoffman
Kay
Reilly
Rollings
Smith
Winship
Stenos

Engr.

Regional Supervisor, Division of Wildlife Refuges

February 5, 1971

EN-H-Lake Andes
Annual Water Program

Acting Regional Engineer

Brashears 2-5-71

Stevenson 2/5/71

Lake Andes NWR - 1971 Annual Water Program

We have reviewed the subject program and have the following comments.

The manager did an excellent job in preparing the individual impoundment data sheets. One slight error was noted and corrected on the Summary of Inflow and Outflow. Corrected copy is attached.

Previous to 1969 daily records of precipitation and temperature was recorded on the monthly gauge record report. This information especially the precipitation should be included as a basic part of the annual water program report. We suggest that this practice be reinstated and a summary of the annual precipitation be included with the annual report.

Edwin B. Stevenson

Attachment

cc:
Refuges--RO
SCBrashears:ce

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

# *Memorandum*


Engr - Stratton

TO : Regional Director, Twin Cities, Minn

DATE: January 23, 1971

FROM : Refuge Manager
Lake Andes NWR

SUBJECT: Supporting data for 1971 Water Management Plan.

The narrative portion of the above report was inadvertently mailed to the Regional Office last Friday.

Attached is the original and 1 copy of the supporting data that should be attached to the previously submitted report.

Ralph F. Fries

Ralph F. Fries

RFF/hc

Attachment

5010-106

*Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan*

ANNUAL WATER MANAGEMENT PLAN, 1971
Lake Andes Refuge

A. GENERAL WATER USES

Lake Andes proper is divided into three management units by two dikes with control structures. The general flow of water is from the north unit to the south unit. The outlet for the lake is on the south side and flows to the Missouri River. A structure here enables the lake to be held at a maximum of 1437.25.

Owens Bay is seperated from the south unit of Lake Andes by a dike. A control structure in the dike permits us to control water levels in Owens Bay. An artesian well flows into Owens Bay and any excess water is discharged into the south unit of Lake Andes.

Approximately 25% of the flow from the artesian well is directed into Prairie Pond starting April 15th. This inundates low lands and increases pair and brood habitat on the refuge. The flow is stopped about the middle of June.

NORTH UNIT

This unit showed a net decrease of .90 feet during the year. The unit was full in the spring but dropped considerably during the dry period in August and September.

Black bass that were stocked in the spring of 1969 were weighing about a pound in mid-summer of 1970.

Aquatic vegetation was similar to the previous year with good stands of sago pondweed.

Breeding waterfowl pairs numbered 42. Ten broods were observed.

The unit was not as heavily used by redheads and canvasbacks as in 1969. Many western grebes were observed on the unit throughout the summer. On July 9, 1970, 43 western grebes were observed and at least 9 of these were young of the year.

CENTER UNIT

Water levels for this unit showed a net decrease of 1.26 feet for the year. Water levels in this unit are becoming critical; I would estimate the maximum depth at about 20 inches.

140 breeding pairs and 44 broods were observed on this unit.

Sago pondweed was abundant throughout this unit. A heavy algae bloom occured in August.

This unit was heavily used by fall migrants.

SOUTH UNIT

Water levels in this unit showed a net decrease of .93 feet for the year. Water levels are down to the stage where a winter fish kill is likely. Some bullhead fishing occurred on this unit.

Sago pondweed was not as abundant as in the center unit; only about 50% of the pool had sago. A heavy algae bloom occurred that caused quite a smell in late August.

This unit had 104 breeding pairs and 31 broods on it.

Fall migrants, especially canvasbacks, used this unit more than the previous year.

A few bullheads were caught in this unit and several black bass and northern pike were observed.

OWENS BAY

Water levels in this unit were fairly stable throughout the year due to the outflow of the artesian well. However, in August the unit was dropping about 2 inches per week even though the well flowed into the bay.

The east end of the bay has a dense stand of cattail. Some hardstem bulrush, sago pondweed and coontail are found in the bay. A moderate algae bloom occurred in August. However, it was not as bad as the south or center units.

This unit was again heavily used by fall migrants. In 1969 most coot used the center unit. However, in 1970 the major coot concentration was on Owens Bay.

About 25% of the water from the artesian well was again diverted into Prairie Pond for about 60 days starting April 15th. We estimate 49.8 acre-feet of water was diverted into Prairie Pond.

B. SUMMARY

Considering all units, water levels are about 1 foot lower than a year ago. Only the north unit and Owens Bay have good water levels at the close of 1970.

Bullfrog tadpoles were stocked in Owens Bay in late fall.

Some bullheads about 1 pound each were caught in the south and center units. Test nettings revealed that previous stockings of bass and northerns in the south and center units were failures. However, the

bass stocking in the north unit was a success. Numerous bass up to a pound were netted in the north unit. However, fisherman were unable to catch any.

C. RECOMMENDATIONS FOR WATER MANAGEMENT IN 1971

Since water levels of Lake Andes are maintained solely by natural runoff, no recommendations for water management can be made for the north, center or south units except for trying to maintain the units at the optimum level of 1436.75; this is .5foot below the maximum outlet elevation of 1437.25. Due to local flooding complaints in high water years, this .5 foot buffer zone is desireable.

Owens Bay should be maintained as close as possible to the maximum of 1440.00. This is the third year that this unit has not been drawn down. Aquatic plant growth was good this year and fall migrants, especially coot, used this unit to a great extent.

The artesian well flow should be diverted into Prairie Pond starting April 15th. Prairie Pond should be kept full until June 15th at which time all well flow into the area should be stopped and diverted into Owens Bay.

Ralph F. Fries

## SUMMARY OF INFLOW AND OUTFLOW 1970
Lake Andes Refuge

| | A. Ave. Annual Evap. | B. 1970 Lake Rise | C. Net Gain A&B | D. Surface acres | E. Ac-ft Gain C&D | F. Outflow in ac-ft | G. Total ac - ft E & F |
|---|---|---|---|---|---|---|---|
| Owens Bay | 3.15 | —.56 | 2.59 | 188 | 487 | | 487 |
| North Unit | 3.15 | — .90 | 2.25 | 477 | 1073 | | 1073 |
| Center Unit | 3.15 | — 1.26 | 1.89 | 1604 | 3032 | | 3032 |
| South Unit | 3.15 | —.93 | 2.22 | 1541<br>3810 | ~~3421~~<br>~~3361~~<br>~~7952~~<br>8,013 | | ~~3421~~<br>~~3361~~<br>~~7952~~<br>8,013 |

Prairie Pond 25% of the well flow flowed into this area for 60 days, with the well flow at 750 gal/min, this would amount to 49.8 ac-ft

1970 inflow - 7952 acre feet
1970 outflow from the refuge (south unit) - 0 ac-ft

Pool: North Unit for Calendar Year 1970

## IMPOUNDMENT DATA

| MONTH | MINIMUM | | | MAXIMUM | | |
|---|---|---|---|---|---|---|
| | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) |
| January | 1434.88 | 499 | 1368 | 1434.88 | 499 | 1368 |
| February | 1434.88 | 499 | 1368 | 1434.88 | 499 | 1368 |
| March | 1435.16 | 514 | 1024 | 1435.90 | 553 | 1904 |
| April | 1435.90 | 553 | 1904 | 1436.70 | 588 | 2369 |
| May | 1436.44 | 577 | 2216 | 1436.68 | 587 | 2357 |
| June | 1436.08 | 561 | 2004 | 1436.32 | 596 | 2145 |
| July | 1435.44 | 529 | 1664 | 1435.85 | 550 | 1877 |
| August | 1435.40 | 527 | 1638 | 1435.42 | 528 | 1651 |
| September | 1434.25 | 463 | 1067 | 1434.25 | 463 | 1067 |
| October | 1431.20 | 130 | 118 | 1431.34 | 147 | 142 |
| November | 1433.98 | 446 | 940 | 1433.98 | 446 | 940 |
| December | 1433.98 | 446 | 940 | 1433.98 | 446 | 940 |

## IMPOUNDMENT DATA

Pool: Center Unit for Calendar Year 1970

| MONTH | MINIMUM | | | MAXIMUM | | |
|---|---|---|---|---|---|---|
| | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) |
| January | 1430.67 | 1694 | 4419 | 1430.67 | 1694 | 4419 |
| February | 1430.67 | 1694 | 4419 | 1430.67 | 1694 | 4419 |
| March | 1430.79 | 1707 | 4646 | 1430.79 | 1707 | 4646 |
| April | 1430.79 | 1707 | 4646 | 1431.56 | 1792 | 6105 |
| May | 1431.24 | 1756 | 6180 | 1431.34 | 1767 | 5688 |
| June | 1430.86 | 1715 | 4779 | 1431.10 | 1741 | 5233 |
| July | 1430.24 | 1646 | 3605 | 1430.70 | 1697 | 4476 |
| August | 1429.75 | 1550 | 2780 | 1430.20 | 1642 | 3529 |
| September | 1429.42 | 1456 | 2292 | 1429.42 | 1456 | 2292 |
| October | 1429.22 | 1400 | 1996 | 1429.28 | 1417 | 2084 |
| November | 1429.38 | 1445 | 2232 | 1429.54 | 1490 | 2469 |
| December | 1429.41 | 1494 | 2277 | 1429.41 | 1494 | 2277 |

## IMPOUNDMENT DATA

Pool: South Unit for Calendar Year 1970

| MONTH | MINIMUM | | | MAXIMUM | | |
|---|---|---|---|---|---|---|
| | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) |
| January | 1430.61 | 1540 | 5196 | 1430.61 | 1540 | 5196 |
| February | 1430.61 | 1540 | 5196 | 1430.61 | 1540 | 5196 |
| March | 1430.98 | 1558 | 5763 | 1430.98 | 1558 | 5763 |
| April | 1430.98 | 1558 | 5763 | 1431.56 | 1580 | 6677 |
| May | 1431.36 | 1572 | 6362 | 1431.56 | 1580 | 6677 |
| June | 1431.16 | 1565 | 6046 | 1431.38 | 1573 | 6393 |
| July | 1430.48 | 1533 | 4997 | 1430.88 | 1553 | 5610 |
| August | 1429.12 | 1436 | 2969 | 1430.37 | 1528 | 4828 |
| September | 1429.63 | 1479 | 3718 | 1429.63 | 1479 | 3718 |
| October | 1429.38 | 1458 | 3351 | 1429.52 | 1470 | 3556 |
| November | 1429.36 | 1457 | 3321 | 1429.68 | 1483 | 3791 |
| December | 1429.68 | 1483 | 3791 | 1429.68 | 1483 | 3791 |

## IMPOUNDMENT DATA

Pool: Owens Bay Unit for Calendar Year 1970

| MONTH | MINIMUM | | | MAXIMUM | | |
|---|---|---|---|---|---|---|
| | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) | Elevation Ft.-MSl | Area (acres) | Capacity (acre-feet) |
| January | 1440.66 | 215 | 452 | 1440.66 | 215 | 452 |
| February | 1440.66 | 215 | 452 | 1440.66 | 215 | 452 |
| March | 1440.72 | 217 | 465 | 1440.76 | 218 | 473 |
| April | 1440.58 | 213 | 435 | 1440.92 | 223 | 507 |
| May | 1440.58 | 213 | 435 | 1440.72 | 217 | 465 |
| June | 1440.45 | 208 | 408 | 1440.52 | 210 | 423 |
| July | 1440.00 | 194 | 313 | 1440.30 | 204 | 376 |
| August | 1439.68 | 169 | 256 | 1440.00 | 194 | 313 |
| September | 1439.48 | 154 | 221 | 1439.48 | 154 | 221 |
| October | 1439.64 | 166 | 249 | 1439.72 | 172 | 263 |
| November | 1439.84 | 181 | 285 | 1440.10 | 197 | 334 |
| December | 1440.10 | 197 | 334 | 1440.10 | 197 | 334 |